



Red Clover Silage Boasts Benefits Over Alfalfa Silage

R.R. SMITH (K 9515-1)

INSET: R.R. SMITH (K9515-2)

Alfalfa is still the most important forage fed to U.S. dairy cows, but red clover may be a better alternative. Feeding studies at the U.S. Dairy Forage Research Center, in Madison, Wisconsin, are showing the benefits of feeding cows red clover silage.

ARS dairy scientist Glen A. Broderick reports that switching cows from alfalfa to red clover silage could help reduce excess nitrogen in manure, a benefit to the environment.

Typically, more than half the protein in alfalfa silage breaks down into non-protein nitrogen (NPN). NPN is used less efficiently than intact protein by the cow during lactation. If not used to make milk, the excess nitrogen is excreted from the animal. Red clover silage, on the other hand, has just 60 percent of the NPN of alfalfa, on average. That's because red clover has an enzyme—polyphenol oxidase—that reduces protein breakdown in the silo.

To reduce excess nitrogen in the environment while meeting cows' nutritional requirements for milk production, dairy scientists at ARS' research farm in Prairie du Sac, Wisconsin, conducted five feeding trials. In the first three

studies, cows produced somewhat less milk when fed red clover silage because they ate less of it and ingested almost 20 percent less protein. But the situation improved in the two other studies. The cows produced the same amount of milk on less feed. Cows produced an average of 68 pounds of milk per day on 54 pounds of dry matter from the alfalfa diet, but they produced 69 pounds of milk per day on only 49 pounds of dry matter from the red clover diet.

"This translates to a 10-percent increase in feed efficiency and a 10-percent greater energy value for cows fed red clover silage," says Broderick. Also, dry matter and fiber digestibility averaged 6 percent and 20 percent more, respectively, in cows fed red clover.

Protein efficiency was 17 percent better on red clover than on alfalfa over the course of the latter two trials. Even if this improvement applied only to the first half of lactation—when cows are fed the most protein—nitrogen excretion would be reduced by about 1.5 tons per year on a 100-cow dairy farm.

Red clover grows better than alfalfa in the acidic soils that are common in the

Midwest. In Wisconsin alone, soil tests indicate that 68 percent of the fields tested would require liming to raise pH to a level adequate to grow alfalfa.

Other pluses: Red clover seed is cheaper than alfalfa seed for producers, and red clover will now be easier to grow, thanks to the improved resistance and persistence of new varieties developed by ARS plant breeder Dick Smith. (See "New Red Clover Puts Pastures in the Pink," *Agricultural Research*, December 1996, p. 9.) In the summer of 2000, ARS released these newer varieties, which should persist 12 to 15 months longer than older red clover varieties. Seed will be available to farmers in about 2 years.—By **Linda McGraw**, ARS.

This research is part of Food Animal Production (#101) and Water Quality and Management (#201), two ARS National Programs described on the World Wide Web at <http://www.nps.ars.usda.gov>.

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